DAIMLERCHRYSLER

DaimlerChrysler Corporation

May 8, 2002

Ms. Jacqueline S. Glassman, Chief Council
National Highway Traffic Safety Administration
Room 5219
400 Seventh Street, SW
Washington, DC 20590

Re: Docket No. 2002-11419, "Request for Comments; National Academy of Science Study and Future Fuel Economy Improvements, Model Years 2005-2010," 67 *Fed. Reg.* 5767, (Thursday, February 7, 2002)

Dear Ms. Glassman,

DaimlerChrysler Corporation is hereby presenting its response to the National Highway Traffic Safety Administration (NHTSA) Request for Comments (RFC) regarding the National Academy of Sciences (NAS) study and potential light-duty truck fuel economy standards for the 2005 to 2010 model years. Our response to the 20 questions in the main body of the RFC is attached along with responses to the sixteen supplemental questions. DaimlerChrysler also fully supports the comments provided by the Alliance of Automobile Manufacturers (the Alliance).

When setting the level of future light-duty truck Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation ACT (EPCA), NHTSA must base its decision on the maximum feasible average fuel economy that manufacturers are capable of achieving based on four factors: technical feasibility, economic practicability, the effect of other Federal motor vehicle standards on fuel economy, and the need of the nation to conserve energy. We look forward to working with NHTSA on this important project.

DaimlerChrysler supports NHTSA's desire to set multi-year light-duty truck CAFE standards and is pleased the agency recognizes leadtime as an important factor in determining technological and product change capability of manufacturers. However, we must point out that there are risks in projecting appropriate standards too far out in time. The capability for manufacturers to increase fuel economy is a result of many factors. These include: availability of technology options, cost of technology, level of technology applied, success of each new technology in meeting its targets, range of product offerings, overall economic climate, customer requirements for utility, size, performance, usage patterns, options, and powertrains, and the level of new regulations in vehicle safety and emissions. The ability to predict, with any certainty, the likely values for any of these trends is dramatically reduced the further out in time for which the prediction is made.

DaimlerChrysler feels strongly that the economic practicability of any proposed standard cannot be assessed if the underlying assumptions are not predictable within a fairly narrow range. The only method to improve the confidence level of the assessment of

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economic practicability would be to set fuel economy levels that can be achieved under any of the likely scenarios. Reaching the appropriate balance between uncertainty and the stability of future CAFE standards is a challenging task. As we demonstrate in our detailed comments, setting multi-year standards for the 2005 – 2010 model years pushes the limits of uncertainty, but is the appropriate end-point considering the range of likely scenarios.

DaimlerChrysler is also concerned with the significant issues imposed by the test procedure changes enacted by the U.S. Environmental Protection Agency (EPA) since the last time NHTSA revised the light-duty truck CAFE standard. The changes in test procedures can result in significant deterioration of a vehicle's reported fuel economy with the effect due to the use of electric dynamometers alone reducing fuel economy by 3-6% on an identical vehicle. Passenger cars have a "test procedure adjustment" to account for such changes. Truck adjustments have historically been accounted for in the level of standard proposed. We recommend that NHTSA continue to address these test procedure issues through the level of the light-duty truck CAFE standards that will be proposed.

Included in our response to the NHTSA RFC is detailed information on future product plans, CAFE projections, technical plans, and investments, all of which are considered by DaimlerChrysler to be confidential and proprietary. This material is covered in part by class determination (2) and (3) set forth in Appendix B to 49 CFR Part 512. Confidential versions of DaimlerChrysler's response are being submitted to the Chief Counsel of NHTSA under this cover note. Non-confidential versions are being submitted to the docket. DaimlerChrysler respectfully requests that NHTSA provide confidential treatment for the material so designated until December 31, 2014. Public release of this information prior to this date would result in competitive harm to DaimlerChrysler, since other manufacturers could modify their own product plans based upon this information.

If the Agency decides to make public or release outside of the Department of Transportation any of the information for which we are requesting confidential treatment, we request at least 10 days advance written notice of your intent to release and the reason for its intended release. We believe that this will allow the Agency to discharge its responsibilities under Title V of the Motor Vehicle Information and Cost Savings Act, and at the same time afford us an opportunity to protect our rights should the confidentiality of this material be threatened. It is requested that notice concerning the Agency's determination of confidentiality for these materials be sent to my attention.

Please contact me at (248) 576-8076 or Jerry Esper at (248) 576-5499 if you have any questions regarding our comments.

Sincerely,

Reginald R. Modlin

Reginald R. Modlin
Director
Environmental and Energy Planning

Attachments

CC: Docket No. 2002-11419 (non-confidential version)

AFFIDAVIT IN SUPPORT OF REQUEST FOR CONFIDENTIALITY

I, Bernard I. Robertson, being duly sworn, depose and say:

That I am Senior Vice President – Engineering Technologies and Regulatory Affairs for DaimlerChrysler Corporation and that I am authorized by DaimlerChrysler to execute documents on behalf of DaimlerChrysler;

That the information contained in the DaimlerChrysler Corporation response to the National Highway Traffic Safety Administration (NHTSA) "Request For Comments on; National Academy of Science Study and Future Fuel Economy Improvements, Model Years 2005-2010," dated February 7, 2002, and the "Correction to Request for Comments; National Academy of Science Study and Future Fuel Economy Improvements Model Years 2005-2010," dated April 22, 2002, so designated as confidential is confidential and proprietary and is being submitted with the claim that it is entitled to confidential treatment under 5 U.S.C. 552(b) (4) as incorporated by reference in and modified by Section 505(d) (1) of Title 5 of the Motor Vehicle Information and Cost Savings Act, as well as under 18 U.S.C. 1905 and under 49 C.F.R. Parts 7 and 512;

That I have inquired of the personnel responsible under DaimlerChrysler's procedures for the classification and clearance for release of proprietary and confidential information to ascertain whether the referenced information for which a claim of confidentiality has been made has ever been released to the public by DaimlerChrysler;

That based upon such inquiries, to the best of their and my knowledge and belief the referenced information for which DaimlerChrysler has claimed confidential treatment has never been released to the public by DaimlerChrysler;

That I make no representations beyond those contained in this affidavit and in particular I make no representations as to whether this information may become publicly available because of unauthorized or inadvertent disclosure; and

That to the best of my knowledge and belief the information contained in the response identified above and so designated as confidential and proprietary and the information contained in the enumerated paragraphs of this affidavit is true and accurate and that therefore this affidavit has been executed on behalf of DaimlerChrysler Corporation

Bernard I. Robertson

Bernard I. Robertson
May 8, 2002

Subscribed in my presence and sworn to before me, by the affiant above named, this

May 7, 2002

Kelli K. Myers

KELLI K. MYERS
Notary Public, Macomb County, Michigan
My Commission Expires August 29, 2002

DaimlerChrysler Comments on
National Highway Traffic Safety Administration
Request for Comments;
National Academy of Science Study
and Future Fuel Economy Improvements,
Model Years 2005-2010
Docket No. 2002-11419

May 8, 2002

The National Highway Traffic Safety Administration (NHTSA or the Agency) requested comments on the National Academy of Sciences (NAS) Report and the potential for fuel economy improvements in the years 2005 through 2010. An original notice, "Request for Comments; National Academy of Science Study and Future Fuel Economy Improvements Model Years 2005 – 2010" (67 *Fed. Reg.* 5767) was published on February 7, 2002, and a subsequent correction "Correction to Request for Comments; National Academy of Science Study and Future Fuel Economy Improvements Model Years 2005 – 2010" (67 *Fed. Reg.* 19536) was published on April 22, 2002. The two notices ask twenty general questions on the NAS Report, the potential to improve fuel economy through the application of technology, the impact of other factors on fuel economy, the impact of the Corporate Average Fuel Economy (CAFE) system on safety, and other issues related to CAFE standards for light-duty trucks (LDTs). The notices also asked a number of questions regarding future product plans for LDTs and the fuel economy potential for the fleet that require detailed and highly confidential information to be submitted to the Agency. This DaimlerChrysler response includes confidential information requiring confidential treatment as described in our cover letter. Confidential paragraphs in the attachments are shown in boxes, in some cases the entire attachment is considered confidential and is so indicated.

DaimlerChrysler Corporation is responding to the Request for Comments (RFC) on behalf of the global company DaimlerChrysler, AG and is also including the projections for Mitsubishi Motors Corporation (MMC) products, which are included in the DaimlerChrysler Corporation CAFE reporting fleet. In addition to our highly confidential projections and future product plans, we are also providing general comments on future technology, the interaction of CAFE and safety, and the other issues raised in the RFC. DaimlerChrysler also assisted in the development of the comments of the Alliance of Automobile Manufacturers (the Alliance) and fully supports those comments.

In question #1 NHTSA requests comment on the impact of CAFE on safety and the discussion of this topic in the NAS Report. The NAS Report found that the downweighting / downsizing that took place in the late 1970's and early 1980's led to increased traffic casualties, as compared to what would have been the case had vehicle size/weight remained the same. DaimlerChrysler believes that under the current system, modest increases in CAFE are feasible without requiring downsizing / downweighting, provided that future standards are not increased at a rate that *requires* such actions as opposed to standards that are based on technological capability. Further information on this point and the other safety related questions asked by NHTSA, is included in Attachment 1.

In questions #2 through #4, NHTSA requests comment on the feasibility and cost-effectiveness of various technologies to improve fuel efficiency. It is important to maintain the distinction between fuel “economy,” which is only related to the fuel used per mile by a vehicle and the fuel “efficiency,” which also accounts for the utility of the vehicle. A seven-passenger vehicle may be much more “efficient” than a small two-passenger vehicle even though it has lower fuel “economy” expressed in miles per gallon. DaimlerChrysler provides an assessment of various technologies in the general sense in Attachment 1 and additional specific information on product costs and implementation plans in Attachments 5, 6, 8, 9, 10, 11, and 13, all of which are confidential. Portions of Attachment 1 are also confidential.

In question #5, NHTSA requests comment on what analyses of fuel economy potential are available for the 2005 to 2010 MY. As noted in Attachment 1, DaimlerChrysler has contributed to the summary of the various studies contained in the response provided by the Alliance and has no additional comments to offer in response to this question.

In question #6, NHTSA requests comment on the usage characteristics of light trucks. As we point out in Attachment 1, there are numerous studies available on this topic. These studies all confirm that purchasers of light trucks demand a high level of utility and functionality and that a majority of them use their vehicles to tow either a boat or a trailer or to haul cargo or perform other tasks for which passenger cars are not well suited.

In question #7, NHTSA requests comment on the impact of CAFE on vehicle miles traveled (VMT). The commonly accepted price elasticity of VMT is a negative 3.5 percent, which means that a 10 percent reduction in per mile vehicle fuel consumption actually only reduces fuel consumption by 7 percent as consumers drive more miles in response to the lower per mile cost of driving. The calculations supporting this point are shown in Attachment 1. A discussion of the implications of this effect and the other policy options that could address this is included in Attachment 2.

In question #8, NHTSA requests comment regarding how other Federal standards are likely to affect manufacturers’ ability to improve CAFE. Recently introduced and anticipated future safety and emissions standards are likely to reduce manufacturers’ ability to improve fuel economy for two reasons. First, as new standards require manufacturers to add weight to vehicles, manufacturers must apply technology improvements to offset the weight increase just to maintain current fuel economy levels. In addition to “mandatory” safety features, the desire to achieve five star ratings and addition of other safety features like side curtain airbags and anti-lock brakes, just to name two, increase the challenge for manufacturers to maintain current fuel economy levels. Second, emission standards limit the technologies that manufacturers may use to improve fuel economy. The best near-term technology to improve fuel economy is the diesel engine, which is widely used in Europe and elsewhere throughout the world. Emission standards that balance the need to reduce emissions that impact urban air quality with reduced fuel consumption and higher fuel prices create a market that readily accepts this technology. The stringent new Tier 2 emission standards and poor fuel quality in the U.S. virtually eliminate the ability to take advantage of diesel technology before 2010. These issues and the impact of specific safety rules are discussed in

Attachment 1 and detailed estimates of the CAFE impact are included in Attachment 7. Attachment 7 is confidential.

In question #9, NHTSA requests comment on the risks associated with new technologies achieving their potential and how to take these risks into account. DaimlerChrysler is aggressively applying technologies and making considerable investments in new powertrain technologies. The identification and selection of the optimal mix of products and technologies to improve fuel economy will depend on many factors. These include: availability of technology options, cost of technology, level of technology applied, success of each new technology in meeting its targets, range of product offerings, overall economic climate, customer requirements for utility, size, performance, usage patterns, options, and powertrains, and the level of new regulations in vehicle safety and emissions. Long-term projections for new technologies are always risky and the level of uncertainty and risk increases the farther out one projects. Our response in Attachment 1 includes an example of this related to cylinder deactivation (referred to as multiple displacement system or MDS).

In questions #10 through #15, NHTSA requests comment on various possible modifications and alternatives to the current CAFE system. In Attachment 1, DaimlerChrysler provides an analysis of various alternatives to CAFE, including attribute-based systems that attempt to address the linkage between CAFE and weight and thus safety. In addition to the comments in Attachment 1, a complete list of pros and cons for numerous alternatives, including several which are beyond the ability of NHTSA to implement, like a carbon tax, is included in Attachment 2. Some of these alternatives, like a carbon tax, have many advantages over increases in CAFE standards and must be discussed, despite the acknowledgement that NHTSA lacks authority to implement some of these alternatives even if they are clearly more efficient in addressing societal goals than increased CAFE standards. Our comments also point out that the current CAFE system has been in place since 1975 and is well understood. No method to replace or modify CAFE that has been described in the literature or discussed in the political debate is clearly superior to the current CAFE system in ensuring energy savings or a fair distribution of tasks. Each structure has unintended consequences and non-trivial impacts on the automobile sector and consumers. Except for energy demand reduction policies such as a carbon tax (which has attendant political issues), each alternative alters the existing system and creates new winners and losers. DaimlerChrysler does not support any change to the structure and form of CAFE because any change may not be “better” it may just be different.

In questions #16 through #20, NHTSA requests comment on the NAS Report, its assessment and bundling of technologies and the break-even analysis performed. These questions also seek comment on cost benefit analysis, which will play an important role in future NHTSA rulemaking. Numerous studies, including the NAS Report, attempt to provide absolute assessments of various fuel economy improving technologies and apply them to the fleet. Such an approach is not appropriate. The application of any new technology will result in different percent improvements and costs based on the characteristics of the base vehicle, the number of units over which any investment is to be amortized, and a number of other system integration issues that cannot be generalized. Additionally, when several new fuel economy improvement measures are implemented simultaneously, the only way to assess the benefit is through vehicle simulations using sophisticated powertrain and vehicle system interaction modeling tools. The projections produced by these simulations must still be verified with vehicle testing of actual systems. When this is done, it is frequently found that system integration and other customer acceptance issues force compromises that result in lower fuel economy than projected.

While we agree that the NAS Report generally attributes reasonable fuel economy benefits to specific technologies, the “bundling” of technologies as was done in the NAS Report is fundamentally flawed. The NAS Report methodology is flawed because it overlooked all system-level details with respect to how a specific technology interacts with powertrain processes. In addition, some of the listed technologies are available today and produce well-known and understood effects while others may never leave the research laboratory environment, i.e., low risk and high risk technologies are casually mixed under the heading of “emerging” with little regard for their ultimate feasibility. Both the Wankel and the two-stroke engine were once thought of as promising “emerging” technologies, yet they have not contributed to CAFE improvements. It must also be recognized that items like camless valve actuation and variable compression ratio, despite decades of past effort, are unlikely to ever impact vehicle fleets, let alone to do so by 2010!

We agree that hybrid and fuel cell powertrains were appropriately excluded from all vehicle types that were the subject of the NAS Report. Highly unfavorable cost-benefit relationships and functionality are major obstacles to widespread introduction of these technologies in the subject timeframe. While DaimlerChrysler and many other manufacturers are planning to introduce, or already have in production, vehicles with these advanced technologies, they are not yet cost competitive in the marketplace. As these technologies continue to mature, manufacturers will develop valuable technical and market experience through these limited volume programs. However, these technologies have no hope of reaching high volume or of making a significant impact on the maximum technically feasible and cost-effective level of CAFE for the overall fleet. Additional comments on these questions are provided in Attachment 1.

In the appendix to the RFC, NHTSA also requested detailed information on future product plans and the potential for fuel economy improvements. The Appendix requests fleet “specifications” in 16 areas. The DaimlerChrysler response to appendix questions #1 through #13 and appendix question #15 is included in the attachments as listed.

Attachment 3 lists light trucks that are to be discontinued before the 2005 MY. Attachment 3 is confidential.

Attachment 4 lists basic engines that are to be discontinued before the 2005 MY. Attachment 4 is confidential.

Attachment 5 lists new or redesigned light trucks for the 2005 – 2010 MY and their specifications. Attachment 5 is confidential.

Attachment 6 lists new or redesigned engines for the 2005 – 2010 MY and their specifications. Attachment 6 is confidential.

Attachment 7 shows an estimate of the CAFE impact of new vehicle regulations for the 2005 – 2010 MY. Attachment 7 is confidential.

Attachment 8 shows an estimate of the CAFE improvement from new or improved vehicle technologies for the 2005 – 2010 MY. Attachment 8 is confidential.

Attachment 9 shows a projection of material substitution or other design enablers for weight reduction for the 2005 – 2010 MY. Attachment 9 is confidential.

Attachment 10 shows the projected light truck fuel economy by model type and the overall CAFE for the 2005 – 2010 MY. Attachment 10 is confidential.

Attachment 11 provides a summary of transmissions to be used in the 2005 – 2010 MY. Attachment 11 is confidential.

Attachment 12 lists the light trucks for the 2005 – 2010 MY that are projected to have a higher test weight than the comparable 2001 MY light truck. Attachment 12 is confidential.

Attachment 13 shows the investment and piece cost associated with new vehicles and technologies to improve CAFE for the 2005 – 2010 MY. Attachment 13 is confidential.

Attachment 14 shows actual and projected U.S. sales of light trucks for the 1996 – 2002 MY. The column in Attachment 14 showing 2002 MY sales projections is confidential.

Attachment 15 shows the projected total industry sales for the 2005 – 2010 MY. Attachment 15 is confidential.

Attachment 16 shows the 2005 – 2010 MY total production capacity for each of DaimlerChrysler's light trucks. Attachment 16 is confidential. The production capacity exceeds projected sales as DaimlerChrysler, and all of industry, strives to balance the desire to maximize capital utilization and also retain flexibility to respond to market demand. When a particular product is in high demand, manufacturers will increase production to improve overall financial performance. When demand lags, manufacturers consider market actions to improve demand and maintain normal production schedules. Ultimately, manufacturers may be forced to limit production and reduce shifts to balance production with market demand.

In appendix question #14, NHTSA requests that manufacturers provide their assumptions for future fuel prices. DaimlerChrysler does not independently project future fuel prices, but relies on government and petroleum industry sources that show gasoline is plentiful, and real prices are expected to be flat over at least the next decade. Government sources such as the Energy Information Agency (EIA) and U.S. Geological Survey, and private forecasters such as PIRA Energy Group (PIRA) and the World Economic Forecasting Associates (DRI-WEFA) concur that oil prices will be moderate and stable over the near term. North American refinery capacity is currently the constraint on gasoline production, and that is not affected by the origin of crude oil. The following is a summary of these projections:

Energy Information Agency "Annual Energy Outlook 2002 with Projections to 2020," December, 2001:

Energy Prices

The average world oil price is projected to decline from $27.72 (2000 dollars) per barrel in 2000 to $22.48 per barrel in 2001, before beginning a gradual increase after 2002. In 2020, the projected price reaches $24.68 per barrel, as compared with $22.92 per barrel projected in AEO2001, largely due to higher projected world oil demand. Because of the effectiveness of OPEC in managing oil production and the generally slow response of non-OPEC supply to higher world oil prices, projected prices in the years following 2002 remain higher than in AEO2001. (page 2)

PIRA Energy Group "Long Term Oil-Prices Forecast," April 17, 2002:

(2000 $)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
WTI@Cushing ($/bbl)	30.30	25.25	24.15	23.90	23.60	23.95	23.40	22.85	23.15	23.45	23.65

DRI-WEFA Report "Long-Range Forecast 25-Year Trend Projection: Energy Prices," April 9, 2002:

Except for temporary spikes (such as this year's), DRI·WEFA's Energy Service expects the average acquisition price of foreign oil to remain below $30 per barrel until 2015.

USGS "U.S. GEOLOGICAL SURVEY WORLD PETROLEUM ASSESSMENT 2000," April 28, 2000:

Estimated proven reserves in all current oil fields:	859 billion barrels
Estimated additional growth in proven reserves in all current oil fields:	612 billion barrels
Estimated undiscovered conventional oil fields:	649 billion barrels
Estimated available conventional oil:	2,120 billion barrels
All of the oil ever produced in the entire world up to 2000:	536 billion barrels

In appendix question #16, NHTSA requests that manufacturers provide information on production leadtime, expected model life in years and the number of years over which tooling costs are amortized.

DaimlerChrysler is working to speed the time from product conception to vehicle launch in order to improve financial performance and better respond to rapid market changes. However, product quality and system durability are key customer demands and engineering development time is a necessary ingredient for new or improved designs to deliver these attributes. As manufacturers enhance existing technologies and add new technologies to vehicles in order to improve fuel efficiency, care must be taken not to rush technology into production and risk consumer rejection and creation of a negative reputation that will be difficult to overcome, even as the technology matures and improves.

The first phase of product development occurs in parallel with the conclusion of the technology management process, which is required to ensure that new technologies are “customer ready.” New technologies, like continuously variable transmissions, multiple displacement systems, and other fuel efficiency enhancing technologies must be far along in their development process before they can be selected for integration into a new vehicle program. Engineering and manpower resource constraints dictate that new technologies be introduced into a single product to complete system integration and refinement before it can be expanded to other products where it may be suitable. Incorporation of these technologies into a complete product ranges from several months to several years depending on complexity. The industry generally operates on a 36 month new vehicle development cycle from program start to product launch.

In addition to robust engineering practices, sound financial performance is important for the success of vehicle manufacturers. In the current market environment of flat or negative vehicle pricing, any added cost to improve fuel economy must be offset by other cost reductions or process efficiency improvements. Premature retirement of capital and shortened powertrain system or product lifecycles would have severe impacts on the company and the overall financial health of the industry.

Generally, products are renewed and product development costs are amortized on a 6-year cycle with some products like full size pick-up trucks on an 8-year, or longer, cycle. Powertrain cycles are generally longer than for vehicles and are usually on the order of 10 to 12 years with some basic engine or transmission architectures existing for even longer periods. The fully accounted costs of any modifications to vehicles or powertrain components must be amortized over the life of the product.

Summary and Conclusions

DaimlerChrysler is aggressively pursuing fuel economy improvements while striving to meet the needs and desires of our customers in a highly competitive marketplace. While we expect our fleet fuel economy and the CAFE standards to increase, we caution NHTSA not to increase the standards beyond the limits of what can be achieved through the application of technology. No politically feasible alternative system to replace CAFE has been identified that would be an improvement and any alternative system would bring with it a host of new problems and competitive issues. We urge NHTSA not to make any changes to the current structure of the CAFE system.

Question 1: The NAS Study found that the CAFE program, as currently structured, has contributed to traffic fatalities and injuries. As an agency whose primary responsibility is safety and is therefore deeply concerned about the NAS finding, NHTSA requests comments on this NAS finding. Among our questions are: Is the safety impact understated or overstated? Would NAS's proposed changes to CAFE reduce this safety penalty? Could CAFE standards be modified so that manufacturers are encouraged to achieve improved fuel economy through application of technology instead of through downsizing and downweighting? NHTSA requests comments on the extent to which increases in light truck fuel efficiency are feasible during MYs 2005-2010 and on whether any of these increases involve means—such as significant weight and size reduction—that could adversely affect safety. We note that the NAS found that if future weight reductions occur in only the heaviest of the light-duty vehicles, that can produce overall improvements in vehicle safety. If there would be adverse effects, how could they be mitigated?

Is the safety impact understated or overstated?

The NAS Report found that the downweighting/downsizing which took place in the late 1970's-early 1980's led to increased traffic casualties, as compared to what would have been the case had vehicle size/weight remained the same (NAS, 2002). The highway safety literature is rich in the relationship of size/weight to occupant safety. While there is debate as to how much of the downsizing/downweighting was a result of CAFE standards vs. market demand (fuel prices were rapidly rising at that time), the conclusion that size and weight are directly related to safety has long been described in the literature.

In 1977 when the first passenger car CAFE standards were promulgated at the same time that the passive restraint (now, air bag) standard was reissued, NHTSA stated in the preamble to the automatic occupant protection requirements of FMVSS 208 at that time, that one of the reasons for the re-issuance of that standard "…was the **certainty** that an increasing proportion of the passenger car fleet will be small cars, in response to…the automotive fuel economy program…The introduction of these new, smaller vehicles…holds the prospect of an in increase in the fatality and injury rate…The trend toward smaller cars to improve fuel economy…contains a potential for increased hazard to the vehicle's occupants." (Emphasis added.) Thus, the Agency, as it embarked on fuel economy rulemaking, recognized that (1) downsizing/downweighting was necessary to improve passenger car CAFE at that period in time; and (2) it would result in increased highway deaths and injuries.

Additional studies since that time have come to the same conclusion and have quantified the results, all of which closely agree with those of the NAS Report. For example, in a technical report, NHTSA stated that downsizing led to an additional 1,340 fatalities per year due to increased propensity of smaller/lighter vehicles to roll over. In 1990, NHTSA stated "Evaluation [of the weight/size/safety issue] led NHTSA to the conclusion…that the 1000 pound reduction in average car curb weight…results in nearly 2,000 additional fatalities and 20,000 additional serious injuries per year." (Kahane, 1991).

The Agency's study, (Kahane, 1997), which served as the basis for the NAS committee's numerical analysis, concluded that a 100 lb. reduction in passenger car vehicle weight would increase fatalities between by 214 and 390 per year (2-sigma confidence bounds), which, means that if a 1,000 pound reduction actually took place, least 2,000 additional deaths would result annually.

A Brooking-Harvard study (Crandall & Graham, 1988) estimated that CAFE caused a 14 to 27 percent increase in occupant fatalities—an annual toll of 2,200 to 3,900 deaths. An independent USA Today analysis in 1999 concluded that, over its lifetime, CAFE resulted in 46,000 additional fatalities, or more than 2,000 annually. (Healey, 1999).

Other studies, by GM, Leonard Evans, and the Insurance Institute for Highway Safety (IIHS), the Office of Technology Assessment, and many others have all reaffirmed the relationship between size and weight and motor vehicle safety. (Evans, 1990).

The NAS, in reviewing the literature came to the same conclusion, not once, but twice. First, in its 1992 report, the NAS concluded that "fuel economy is adversely linked to safety through reductions in size and weight…any major reduction in vehicle weight carries the potential for reduced safety…" The Committee further concluded that after evaluating previous studies, "[t]he overall conclusion of previous analyses is that the historical changes in the fleet—downsizing and/or downweighting—have been accompanied by increased risk of occupant injury" (NAS, 1992, p. 55). The NAS concluded that "There is likely to be a safety cost if downweighting is used to improve fuel economy…" (NAS, 1992, p. 63) and urged NHTSA to conduct a comprehensive analysis on the subject, which culminated in the Kahane study cited above and which served as the basis for the new NAS evaluation on this issue.

The most recent NAS Report evaluated these previous studies and concluded, "the evidence is clear that past downweighting and downsizing of the light-duty fleet, while resulting in significant fuel savings, has also resulted in a safety penalty. In 1993, it would appear that the safety penalty included between 1,300 and 2,600 motor vehicle crash deaths that would not have occurred had vehicles been as large and heavy as in 1976." (NAS, 2002, p. 2-26) In addition, the report estimates that "there would have been 13,000 to 26,000 fewer moderate to critical injuries. These are deaths and injuries that would have been prevented in larger, heavier vehicles." (NAS, 2002, p. 4-13).

The findings in the safety literature, from such diverse sources as NHTSA, NAS, universities, and the IIHS consistently support the finding of the NAS Report that prior downsizing/downweighting has resulted in a safety penalty and the magnitude in the report of 1,300-2,600 additional deaths per year appears accurate.

Would NAS's proposed changes to CAFE reduce this safety penalty?

It is assumed that the question refers to the NAS's recommended consideration of attribute-based standards, and, in particular, a weight-based standard. The pros and cons of such alternative systems of fuel economy improvements are discussed later in this document and in Attachment 2. While the safety ramifications of such systems could reduce any adverse safety consequences of increased fuel efficiency, they are not necessary to achieve this desired goal. Modest increases in CAFE under the current program design, if based on industry technological capability, can result in reduced fuel consumption from the new vehicle fleet without adverse safety consequences. We believe that any change in the current CAFE system needs to viewed not just in terms of fuel savings and safety but also competitive effects, jobs, consumer choice in the marketplace, costs, and other issues. In this context, we believe that no attribute-based system has been shown to have net benefits in all these areas compared to the present system.

Could CAFE standards be modified so that manufacturers are encouraged to achieve improved fuel economy through application of technology instead of through downsizing and downweighting?

As stated above, under the current system, modest increases in CAFE are feasible without requiring downsizing/downweighting, as did the original passenger car standards. We believe it crucial to distinguish between standards that *require* such actions and those that are based on technological capability. We understand the Administration's concern that the current program does not *prevent* a manufacturer from downsizing/downweighting, but believe that such an option should not be prohibited. First, manufacturers are unlikely to engage in significant downsizing/downweighting unless forced to do so either by regulations or in response to dramatically changed customer preferences. Consumers generally desire attributes other than fuel economy, size and mass being among them. Thus, manufacturers would be opposing their customers' desires by significantly reducing size and weight. Second, the ongoing research into new materials could lead to breakthroughs whereby some level of weight could be taken out of vehicles, at reasonable costs, without adversely affecting safety. Instituting a program that prohibits, or penalizes a manufacturer from this course of action does not seem to be in the public interest. Third, there will always be a mix of vehicles on the road—from motorcycles to semi-trucks. Consumers may desire heavier or lighter fleets in the future and manufacturers need the flexibility to respond accordingly. In the interim, DaimlerChrysler plans to improve the overall CAFE value of its fleet through technological improvements.

NHTSA requests comments on the extent to which increases in light truck fuel efficiency are feasible during MYs 2005-2010 and on whether any of these increases would involve means—such as significant weight and size reduction—that could adversely affect safety.

DaimlerChrysler's plans for improvements in fuel efficiency are noted in the answers to other questions. While we do not plan to have significant weight and size reductions in our vehicles, we should note that new market segments and niche vehicles are being developed constantly. To the extent these new types of models replace or substitute for sales of existing models, our fleets could be slightly heavier or lighter.

> ***We note that the NAS found that if future weight reductions occur in only the heaviest of the light-duty vehicles, that can produce overall improvements in vehicle safety. If there would be adverse effects, how could they be mitigated?***

We believe the question refers to the research conducted by IIHS, which is referenced on page 72 of the NAS Report. That research alleged that if all pickups and SUVs weighing more than 4,000 lbs. were replaced with similar vehicles weighing between 3,500-4,000 lbs. that there could be a net reduction in total fatalities by about 0.26 percent. With a baseline of 26,400 occupant deaths in 1997, such a hypothetical action could reduce fatalities by less than 70 per year. There was no mention in the original IIHS research or the NAS Report as to how much light truck fleet CAFE might improve with such a hypothetical action, but there would be consequences to the competitive positions of manufacturers and jobs. It is important to note that mass does matter, not just in the safety interaction reported in the literature, but also in the ability of manufacturers to meet customer demands for utility including cargo carrying capacity, towing capability, four wheel drive, and other functions. Simply directing weight reduction, or prohibiting it if it were desired by customers for certain vehicles, is not consistent with building vehicles that respond to consumer demands for utility.

We believe this question raises several interesting issues. First, just as the NAS committee urged NHTSA to re-examine the size/weight/safety issue, we believe this concept should be part of that re-analysis. Analyses of the number of vehicles involved, whether the breakpoint is indeed 4,000 lbs. or whether that was simply an arbitrary breakpoint need further research.

Second, the issue of vehicle compatibility is extremely complex, as the Agency well knows, given its intensive research into this area. It involves more than mass but also geometry and stiffness of both struck and striking vehicles. Thus, we can not at this time concur that simply reducing mass of vehicles above a specified weight will truly improve societal safety or whether safety can be improved through other means, without reducing such mass.

Third, the NAS Report is clear that reducing mass always reduces the protection to the occupants of that vehicle. Thus, NHTSA needs to consider both societal safety and individual safety. Should, hypothetically, weights of certain types of vehicles be limited so as to reduce the harm they cause to lighter vehicles with which they may collide, then those occupant would suffer additional harm. This raises public policy issues that we believe NHTSA needs to fully air. In essence, such actions, should they ever occur, would be lessening the safety of those in heavier vehicles to better protect those in lighter vehicles. Consumers should be fully aware of such a trade-off, were it ever to be required. We are not aware of any NHTSA action which, knowingly, sacrificed one portion of the motoring public so as to benefit another.

We also note that the IIHS research and the NAS Report both concluded that safety is improved more significantly not by reducing weight of the heaviest vehicles but by increasing the weight of the lightest ones. The safety benefits of eliminating the lightest cars and/or the lightest cars and SUVs had 5 times the safety benefits of reducing the weight of the heaviest trucks, according to the IIHS research. And, contrary to what most advocates of radically higher CAFE standards argue, even if the disparity among weights of just light-duty vehicles were reduced, crashes of like vehicles, but smaller and lighter than those of today, would actually increase casualties. Thus, from a pure safety perspective, *increasing the weights of the lightest vehicles would yield the greatest safety benefits.* Of course, NHTSA has the unenviable task of considering the tradeoffs among mass, safety and fuel economy.

DaimlerChrysler also believes that the key question NHTSA needs to address in its current updating of Kahane's 1997 study is whether the past is prologue. That is, some have argued that vehicles are much safer now than they were even 10 years ago and a study based on prior year models may not be relevant to future vehicles. Thus, these groups argue, the improvements in safety negate the past negative relationship between size, weight and safety. We would agree that vehicles continue to improve in safety but we also would note that the laws of physics have not changed. While we are better able to manage the relationship between size/weight and safety, we believe the direction of the relationship cannot be significantly altered i.e., significant decreases in size/weight will have adverse safety effects, although perhaps at a smaller (or larger) magnitude than was previously found. We agree with the NAS Report which stated that "although it is possible that the weight, size, and safety relationships in future fleets *could* be different from those in the 1993 fleet studied by Kahane (1997), there appears to be no empirical reason to expect those relationships *will* be different." (Kahane, 1997, pp. 28-29)

It is crucial that NHTSA establish standards that can be met through technological means in the time allotted. Failure to do so would be to counter the hard work done to make safety gains in the recent past, through vehicle safety features, stricter law enforcement, and behavioral changes.

> ***Question 2 What is the technological feasibility and economic practicability of various fuel efficiency enhancing technologies that fall under the general headings of engine, vehicle and transmission technologies? Please comment on each of the following technologies, listed under the general headings below:***
>
> ***Engine Technologies***
>
> ***Engine friction and other mechanical/hydrodynamic loss reduction; advanced low-friction lubricants; multi-valve, overhead camshaft valve trains; variable valve***

timing; variable valve lift and timing; intake valve throttling; cylinder deactivation; engine accessory improvement; engine downsizing and supercharging; camless valve actuation; variable compression ratio engines; electronic engine controls; direct fuel injection for spark ignition or diesel engines; lean burn-fast burn combustion; and two-stroke engines.

Transmission Technologies

Five-speed automatic transmission; six-speed automatic transmission; continuously variable transmission; advanced continuously variable transmission; automatic shift manual transmission; and automatic transmission with aggressive shift logic.

Vehicle Technologies

Aerodynamic drag reduction; and electronic controls; lowering rolling resistance; vehicle weight reduction; substitution of lighter-weight materials; 42 Volt electrical system; integrated starter/generator; hybrid drive trains; and fuel cells.

In answering this question, please address, for each of these technologies, as well as any other relevant/related technologies:

(a) the impact on fuel efficiency;

(b) costs and benefits to the consumer;

(c) manufacturer costs;

(d) lead time;

(e) degree of current use in passenger cars and light trucks;

(f) impacts on safety, including injuries and fatalities; and

(g) potential fleet penetration.

(h) effects of environmental (especially vehicles emissions standards) and other regulations on their application/penetration.

In considering fleet penetration, please address whether some technologies might be appropriate for use on light truck models that would not need high load carrying or towing capability because of primarily personal passenger car type usage. For reference, NHTSA, at the direction of the Congress, commissioned a study entitled Light Truck Capabilities, Utility Requirements and Uses: Implications for Fuel Economy which was published in April 1996. (This study is available from the agency as report number DOT HS 808 378.) Included in that study is a brief summary of fuel economy technologies, their benefits, and their potential conflicts with light truck attributes.

Engine Technologies

Friction reduction opportunities exist is some engines based on cooling system improvements particularly in the upper region of the interbore areas where coolant flows are minimal. This could reduce mixed boundary friction directly and could enable lower oil ring tension based on reduced bore distortion. Lower viscosity lubricants may be directly substituted for present ones in some engines while in others design and specification changes may be required. In-line and V8 engines may tolerate lower viscosity lubricants while high-speed V6 engines with split crankshaft pins may require modifications in the rod bearing area. Offset crankshafts may provide for reduced piston side-loads and friction during the early phase of the expansion stroke where mixed boundary layer friction prevails.

Multi-valve, overhead camshafts and variable valve timing (VVT) schemes that are performance oriented offer conditional fuel economy opportunities. These typically enable pumping loss reductions if accompanied by displacement reduction, but they may also increase friction and/or parasitic losses. Cylinder deactivation for properly-mounted V8 engines is practical and reasonable, but its benefits are conditional. Avoidance of low-speed, high load knock along with unacceptable noise, vibration and harshness (NVH) characteristics may limit the 4-cylinder operating regime and thus compromise the fuel economy potential of this technology. Downsizing with supercharging similarly may offer conditional fuel economy benefits, but it should be noted that means to control knock will offset some or all of the pumping loss benefit. These means include reduced (fixed) compression ratio, fuel-air enrichment and spark timing retardation. While variable compression ratio could provide some knock relief when most needed, practical, low friction and durable implementations are still far from product reality. Camless valve actuation, likewise, is an interesting laboratory tool that offers the ultimate in valve timing flexibility but has a very low probability of ever achieving successful production implementation and will certainly not be in large scale production in the time period under review.

Those approaches that rely on combustion systems that produce lean or oxygen-containing catalyst feed gasses need not be considered any further given the stringency of the US emissions regulations in the subject time frame.

Two stroke engines need not be given further consideration for the automotive duty cycle applications. The critical flaw resides in the stochastic (or not well behaved) nature of the gas exchange processes. In particular, this feature causes the residual gas fraction to be non-repeatable on a cycle-by-cycle basis.

Transmission Technologies

Transmission technologies that afford measures of engine loading flexibility may be beneficial to fuel economy if they can successfully allow the engine to operate in higher efficiency modes, i.e., higher loads and lower speeds. Remaining concerns include: how internally efficient are these machines, and can they provide driveability and performance attributes that are appealing to customers? All stated options rely on torque converters except for the automatically-shifted “manual” transmissions (EMAT), which rely on clutches. While the torque converter provides highly attractive vehicle launch performance, its efficiency is rather low when it is providing torque multiplication. Continuously Variable transmissions (CVTs) and 5- and 6-speed automatics may provide means to more aggressively lock the torque converter thus minimizing associated losses. This is clearly beneficial to fuel economy, provided that they are implemented in ways that are driveability and NVH friendly. EMAT transmissions rely on clutches (not torque converters), and as such clutch heat management and shift quality are challenges that must be confronted. While CVTs offer great control flexibility, they themselves are rather inefficient owing mainly to large parasitic losses incurred by their high-pressure hydraulic system.

Vehicle Technologies

Vehicle aerodynamic losses are determined mainly by the cross sectional area and the rear-end geometry. Vehicles such as cars which have sloping rear sections are aerodynamically favored over similarly-sized vehicles such as vans, SUVs, sport wagons and pickups. This is a first-order effect. A myriad of other factors including ground clearance and side-view mirrors constitute second-order effects. Assuming other factors are equal, aerodynamic performance and vehicle utility countervail.

Broadly speaking, rolling resistance and wheel-to-ground traction go hand-in-hand. Incremental improvements in tire materials and design will provide a small measure of improvement over time.

The expanded use of light weight materials is clearly beneficial to fuel economy, but formidable cost and safety issues remain.

42 volt electrical systems begin to be attractive when electrical loads approach 3 kW. When integrated with a full complement of electrically-driven accessories some fuel economy benefits can be realized when combined with integrated starter generator (ISG) systems. Implementation schemes are highly varied as are the results. ISGs configured for idle-off typically includes electric power steering, electric coolant pump for cabin heat, electric pump for the automatic transmission, and idle-off is typically disabled when the air conditioner is on. Some measure of regenerative braking and launch assist is also a possibility. System costs can be enormous and results highly variable and drive cycle specific. Hybrid drive trains and fuel cell power need not be considered here.

Question 3. What is the cost-effectiveness of each technology identified in Question 2, as well as any other relevant technologies, assuming alternative plausible gasoline prices forecast for MY 2005-2010, and assuming alternative

payback periods ranging from 3 years to 10 years?

Each of the vehicle technologies described above have attributes that are highly mission and duty-cycle sensitive and are therefore very difficult to characterize in real-world fuel economy terms. The application of any new technology will result in different percent improvements and costs based on the characteristics of the base vehicle, the number of units over which any investment is to be amortized, and a number of other system integration issues that cannot be generalized. Additionally, when several new fuel economy improvement measures are implemented simultaneously the only way to assess the benefit is through the use of sophisticated vehicle simulation tools that estimate the system level interactions of technologies. The projections produced by these simulations must still be verified with vehicle testing of actual systems. When this is done it is frequently found that system integration and other customer acceptance issues force compromises that result in lower fuel economy than projected.

As noted in our answer to the question regarding projected fuel prices contained in our response to comments, the long-term fuel price is expected to remain flat for at least the rest of the decade. While there may be short term or regional price spikes due to refinery or pipeline disruptions, these are not expected to have a noticeable impact on customer demand.

When calculating the cost-benefit of technologies, the value of the fuel saved through the application of technology must be compared to the fully accounted costs of those technologies. Internal DaimlerChrysler analysis of Strategic Vision survey data show that the median consumer who purchases or leases a new vehicle owns his or her new vehicle for about three and half a years. This supports the assumption used by the NAS in its three year break-even analysis (NAS, 2002) and DaimlerChrysler agrees that this is the appropriate pay back period to use for such analyses.

Question 4. Taking into account the response to Question 2, and the statements recently made by Ford and General Motors about the fuel economy of their vehicles by 2005, and DaimlerChrysler's response, indicate the ability of each manufacturer to improve its light truck CAFE for each model year during the MY 2005-2010 timeframe. Specify the fuel economy improvements on a vehicle-by-vehicle basis that will result in the achievement of the manufacturers fuel economy pledges. For each vehicle, please list the specific technologies that will be employed and the increase in fuel economy attributed to such technology. By what model year would maximum penetration of all current fuel economy enhancing technologies be feasible? Why wouldn't such maximum penetration be feasible earlier than that model year?

Our detailed product plans to achieve this goal are identified in Attachment 10.

Question 5. What analyses of manufacturer light truck fuel economy capabilities for MY 2005-2010 are available? What are the strengths and weaknesses of each such analysis?

DaimlerChrysler agrees with the summary of studies contained in the comments provided by the Alliance of Automobile Manufacturers and has no additional comment to offer in response to this question.

Question 6. What data are available on the usage characteristics of light trucks, i.e., how many passengers and/or how much cargo the different types of light trucks typically carry? What survey and other data are available on the importance that consumers place on the fuel economy of light trucks relative to other vehicle attributes?

This question seems to reflect the concerns of some people over the trend in increased sales of light-duty trucks. At the request of industry, J.D. Power and Associates conducted research (J.D. Power, 1998), which shows that functionality and performance have always been a key draw for light-duty trucks. Therefore, manufacturers must offer more and more competing vehicles within each truck segment to satisfy consumer demand for utility and the desire to own unique vehicles. The J.D. Power study discusses the boom in the light-duty truck market that occurred in the 1980s through the mid-1990s and the reasons that the light-duty truck market, while continuing to increase, will grow at a reduced rate.

The study points out that in addition to utility and function, consumers are now also looking for exterior styling/appearance and more user friendly amenities in addition to core functionality needs. The study also discusses segment dynamics such as the fact that larger luxury SUVs and mini SUVs are actually attracting buyers from other SUV segments (J.D. Power, 1998, p. 19). The notion that SUVs are continually replacing cars is incorrect, because in many cases, they are replacing other SUVs. The study predicts that a trend toward additional product offerings will continue, even though the total growth rate in light-duty trucks will follow relatively normal growth patterns.

Most importantly the study provides the following observations regarding the light-duty truck market: “[o]ver half of all light-duty truck owners use their vehicle to tow either a boat or trailer” (J.D. Power, 1998, p. 6), “…it is the combination of favorable functional attributes as well as safety components (four-wheel drive and improved visibility) coupled with styling and image that attract buyers” (J.D. Power, 1998, p. 18), and “[a]long with the improvements in quality, consumer satisfaction and corresponding sales were enhanced by core attributes such as functionality, including towing capacity and cargo space” (J.D. Power, 1998, p 18).

Numerous other studies have been published on the reasons for purchase and use of new vehicles. DaimlerChrysler has relied on research conducted by Maritz Market Research Inc. (Maritz), Research Data Analysis, Inc. (RDA) and Strategic Vision, Inc. (Strategic Vision). This research shows that consistently more purchasers of new trucks rate power and pick-up as very or extremely important than fuel economy. For the last five years the difference has been very steady with about 10 percent more purchasers rating power and pick-up as very or extremely important. (Strategic Vision, annual). When all of the survey items are tallied, fuel economy consistently ranks low on the list, usually in the low to mid 20s. In fact only one percent of truck purchasers identify fuel economy as the most important factor in the purchase decision. (Maritz, RDA, Strategic Vision).

The research consistently shows that purchasers use their trucks for many things that passenger cars are not well suited for. Consistent with the J.D. Power Study, the annual surveys find that a large majority of purchasers use their trucks, SUVs and vans, to haul cargo and large items, to tow boats and trailers, and to go off-road. While these vehicles are also used to run errands and commute to work, purchasers are buying them for their peak usage needs: to go on vacation, car pool, haul and tow things and do other things that by there very nature limit the improved fuel economy potential of these vehicles. (Maritz, RDA, Strategic Vision).

Question 7. By their nature, fuel economy standards lower the marginal cost of driving. What effect does this cost difference have on vehicle miles traveled?

The broadly accepted VMT price elasticity is -0.35, or an increase in miles driven of 3.5 percent occurs with every 10 percent reduction in the cost per mile (Cartalk, p. 16). Here, the relevant metric is price per mile of travel. Over the entire national vehicle fleet, there will be no difference between a 10 percent reduction in fuel consumption per mile, and a 10 percent reduction in fuel cost per mile. VMT will increase from the reduction in dollars spent per mile. A calculation of the impact of this effect will illustrate the point. For a hypothetical fuel consumption improvement of 10 percent (equivalent to an 11.1 percent fuel economy increase from 22.0 mpg to 24.4 mpg) will increase miles driven by the same amount as a 10 percent drop in fuel prices from $1.50/gallon to $1.35/gallon, i.e. 3.5 percent increase in VMT over the “normal” range of gasoline prices. As shown in the following table, which steps through the calculations, the net effect is a 7 percent reduction in fuel consumption, not a 10 percent reduction.

Calculation of fuel saved with VMT rebound:

		Note
base fuel consumption	0.04545 gal/mile	(22.00 mpg)
hypothetical new fuel consumption	0.04092 gal/mile	(24.44 mpg)
reduction in consumption	0.00453 gal/mile	10.0%
base miles driven	15000 miles	
increase in miles driven	525 miles	3.5%
actual miles driven	15525 miles	
base fuel consumption	681.8 gal	
“no rebound” fuel consumption	613.7 gal	
“no rebound” fuel saved	68.1 gal	10%
actual fuel consumption	635.3 gal	
actual fuel saved	46.5 gal	7%

Question 8. To what extent are other Federal standards likely to affect manufacturers' CAFE capabilities in MYs 2005-2010? Answers to this question should include not only the effects of such standards when first implemented, but also the prospect for reducing those effects subsequently.

DaimlerChrysler has identified the following actions that are intended to improve motor vehicle safety but that can degrade CAFE due to added weight and/or power requirements. We have divided these actions into several categories for ease of presentation. Specific fuel economy effects of these regulations on the light-duty truck fleet are shown in Attachment 7.

<u>Rules already issued:</u>

There are three promulgated safety standards that either are in the process of being phased-in or will have a phase-in cycle begin subsequent to the MY 2001 baseline.

The first of these involves changes made to vehicle structure to comply with the LATCH requirements of FMVSS 225, <u>Child restraint anchorage systems.</u> The phase-in continues through MY 2002 and there are still pending petitions that can further affect vehicle weight beyond MY 2002.

The second is the upper interior head protection requirements of FMVSS 201, <u>Occupant protection in interior impact.</u> Again, the phase-in ends with MY 2002. Thus, several of our models will have weight changes from the MY 2001 baseline as a result.

Last are the advanced air bag requirements of FMVSS 208, <u>Occupant crash protection.</u> The initial phase-in begins with MY 2004 and is to be completed with MY 2007 vehicles. There are still pending petitions for reconsideration as well as petitions for rulemaking from DaimlerChrysler, the Alliance, and other individual manufacturers. Principal among these requests is a change in the phase-in percentages for MYs 2004 and 2005. The Agency’s response to this request, as well as other outstanding technical issues, can further change our CAFE projections. Also of concern is Phase II of this rule, which currently increases belted occupant protection from a 30 mph barrier test to 35 mph. The addition of dummies other than the 50th percentile male is still an outstanding issue. Finally, the litigation instituted by Public Citizen to raise the unbelted test requirement from 25 mph to 30 mph can have significant effects on vehicle structure as well as create a drain on our engineering resources.

<u>Expected safety rulemakings:</u>

DaimlerChrysler believes that several of the required rulemakings under the TREAD Act can affect the fuel economy of our vehicles. These include the low tire pressure warning indicator rule, which is anticipated at any time, and the promulgation of a final rule on improved tire performance. While NHTSA recently extended the comment period on the latter, the rulemaking could result in changes in tires sizes as well as rolling resistance. It is premature for us to comment further on these pending the Agency's decisions. We note that while ensuring proper tire inflation is important for safety and will improve real-world fuel economy performance of the fleet, ensuring proper tire pressure of the in-use fleet has no benefit for CAFE compliance as tire pressure is already verified as part of the CAFE vehicle test procedures.

We are also uncertain as to the Agency's determination of which dynamic test(s) it might choose to rate vehicles for their rollover resistance. While this is a consumer safety program and not a mandatory safety standard, DaimlerChrysler examines such rating programs seriously and may make changes to its products that result in higher ratings so long as they also improve, or do not degrade, real world safety.

NHTSA has just issued an NPRM and ANPRM regarding improvements in child safety, primarily through changes to be made to add-on child restraints. However, such changes are also likely to affect, in a manner we can not yet determine, the built-in child restraints provided in our minivans. Whether changes that add weight need to be made to our minivans to meet the new requirements, or whether the new requirements preclude the use of built-in restraints, is unknown to us at this stage of the rulemaking. In addition, the Agency has suggested possible changes to vehicle interiors—e.g., adding a lower tether anchor to anchor the add-on child seat to the vehicle's floor—that could require structural additions to our vehicles.

<u>Other possible safety rulemakings:</u>

While DaimlerChrysler can not predict the outcome of rulemakings that the Agency has initiated, or stated that it intends to, or might, initiate, we would note that there are cross-effects (safety affecting fuel economy or fuel economy improvements being subject to safety standards) as briefly discussed below:

FMVSS 102, <u>Transmission shift lever sequence, starter interlock, and transmission braking effect</u>—idle stop technology may be affected by changes to this standard and could impact transmission/drivetrain parasitic losses.

FMVSS 108, Lamps, reflective devices, and associated equipment—the Agency has a pending petition to mandate daytime running lights. Were such a rule to be promulgated, there would be some degradation of fuel economy measured on the CAFE test.

FMVSS 135, Passenger car brake systems—the discussion between OMB and NHTSA on the low tire pressure monitoring indicator rule raised the possibility of mandating anti-lock brake systems. This would add weight to a large portion of our passenger car fleet, which currently does not have ABS.

FMVSS 202, Head restraints—NHTSA has issued a proposal to upgrade the performance of front head restraints and possibly require rear head restraints. This could lead to significant weight increases in terms of seat strength and the additional rear head restraints, which are not in all our vehicles.

FMVSS 205, Glazing materials—NHTSA has been researching the possibility of requiring glass/plastic side glazing to reduce ejections. This would add weight to the vehicle.

FMVSS 206, Door locks and door retention components—Again, NHTSA has conducted research on the possibility of upgrading door latches to prevent door openings in crashes and thus reduce ejection. At its March 2002 public meeting on rulemaking status, NHTSA indicated it plans on issuing a proposed rule this summer. Added weight is again a possibility but in the absence of a specific proposal can not be quantified at this time.

FMVSS 207, Seating systems—The Agency also stated at the March 2002 public meeting that it would issue a proposed rule to upgrade seat back strength. There is a distinct probability that a new rule in this area would require added vehicle weight.

FMVSS 208, Occupant crash protection—In addition to the advanced air bag requirements, NHTSA has received a “prompt” letter from OMB urging the Agency to consider issuing an offset test requirement and the Agency noted that it expects to issue such an NPRM by the end of this year. Depending on whether or not this proposed rule is harmonized with the IIHS and EuroNCAP test protocols, we can not at this time list the vehicle changes we would be required to make, but again additional structure and thus increased weight is a distinct possibility.

FMVSS 216, Roof crush resistance—NHTSA has issued a request for comment on changing the roof crush standard. Many commenters to the request indicated that roofs should be made stronger. The issuance of a rule that required this would again be likely to increase vehicle weight.

FMVSS 301, Fuel system integrity—The Agency has indicated that it will publish a final rule to upgrade rear impact fuel system performance by increasing the test speed from the current 30 mph to 50 mph and with a different barrier. In addition, the Agency proposed an offset, compared to the current full barrier test. Significant weight increases in some models are possible as a result of this rule.

Other safety actions that could affect fuel economy

DaimlerChrysler's policy is to improve real world safety whenever practical as well as to perform well in the various consumer safety information programs run by NHTSA, IIHS, EuoNCAP and others. In this context, we believe the Agency should interpret this statutory criterion more broadly than just looking at the effects of other Federal *standards* on fuel economy but should take account of manufacturer actions that go beyond regulatory requirements, particularly in the safety area where added weight and improved safety often go hand-in-hand.

We would note that IIHS is poised to begin a new side impact rating program, perhaps as early as later this year. We are examining what changes might be appropriate to our vehicles if this program were initiated but can say that added weight is a likely effect.

Our vehicles also contain safety devices that are not required by any standard. These include side air bags and curtains, electronic stability program, traction control, anti-lock brakes, and others. Estimates of added weight due to these types of safety improvements, if not included in this submission, will be generated for the next stage of the rulemaking to assist the Agency in determining the appropriate levels of future light truck CAFE standards.

Question 9. In setting CAFE standards, the agency takes into consideration that there are often technological risks associated with actually achieving the full potential fuel economy improvement from a particular type of technology. How should the agency take technological risks into account in setting these light truck CAFE standards? What technological risks are associated with gaining the full potential fuel economy improvements from any of the available types of fuel economy enhancing technologies? What are the prospects for overcoming those risks or offsetting their effects on CAFE capability?

Question 10. Please comment on the idea of an attribute-based system. Provide feedback on which attribute(s) such a system should be based on and the specific classes of vehicles that might fall under each class. In addition, please suggest the fuel economy level associated with each specific class of that attribute-based system (e.g., vehicles weighing from 2,000 lbs. GVWR to 2,500 GVWR would have to meet an average of xx.x MPG).

The current CAFE system has been in place since 1975 and is well understood. No method to replace or modify CAFE that has been described in the literature or discussed in the political debate is clearly superior to the current CAFE system in ensuring energy savings or a fair distribution of tasks. Each structure has unintended consequences and substantial effects on the automobile sector and consumers. Except for energy demand reduction policies such as a carbon tax (which has attendant political issues), each alternative only alters the existing system and creates new winners and losers. DaimlerChrysler discourages any change to the structure and form

CAFE. Any change to CAFE toward an attribute based system will not be better; it will only be different.

The "fundamental flaw" of the CAFE system is that it cannot accomplish its stated purpose of reducing petroleum imports. The percent of petroleum that is imported is not related to the fuel economy of the new vehicle fleet, but is a function of world-wide petroleum supply and pricing. No level of CAFE increases will overcome the economics of the oil supply situation. In fact, if world-wide oil demand were magically cut in half, the current high cost providers of crude oil would be forced out of the market as the price of crude dropped below their cost of production. This would leave only the low cost providers of crude in the market and would almost certainly increase the percent of petroleum that the U.S. imports.

Attachment 2 contains a summary of the pros and cons of various alternatives on which NHTSA has requested comment, as well as several other alternatives that have surfaced in the public policy debate. Attachment 2 also discusses implementation issues and competitive effects that accompany the various alternatives in general terms because specific answers for any alternative would depend on the details of the proposed alternative.

Question 11. Please comment on the possibility of tradable fuel economy credits and the potential cost and benefits to each manufacturer.

In addition to the information in Attachment 2 containing the summary of the pros and cons of various alternatives, we offer the following comments on the possibility of trading of fuel economy credits. If classes are narrowly defined, as in the NAS Report, with four car segments and six truck segments, the ability of a manufacturer to carry credits forward or backward is useless, as there will be few instances of a manufacturer with multiple vehicles in one segment. Any cap and trade system provides a direct subsidy to manufacturers based in high fuel cost markets. This increases the ability of importers to continue to build low fuel efficiency vehicles specifically for the U.S. market, thereby reducing their fleet fuel consumption.

There is no effect on the overall CAFE of the entire fleet as such a system just shifts the product offerings of manufacturers constrained by CAFE to those that are not constrained. Such a system would have no benefit (or cost) if increases in CAFE standards are limited to the amount achievable through the application of new technologies and adequate lead time is provided. The only time such a system would come into play is if CAFE standards were to increase at a rate faster than a manufacturer could improve the fuel efficiency of its products through the application of cost-effective technologies. Even in this circumstance, it is questionable whether manufacturers would make use of such a system because of the competitive implications of providing funds to other manufacturers and the ancillary problems related to public image and corporate reputation.

We fully support maximizing the flexibility provided to manufacturers (like that provided by the current carry-forward/carry-back provisions in CAFE). However, it is absolutely critical that the ability to comply with increased standards through the use of such flexibility provisions not be confused with standards that are technologically feasible and cost effective on their own. Flexibility mechanisms cannot be used to justify the setting of standards that are not otherwise technologically feasible and cost-effective.

Question 12. Please comment on the effect that elimination of the two-fleet rule would have on manufacturers, consumers, employment, the U.S. marketplace, and on the automotive industry in general.

Comments on the elimination of the two-fleet rule are contained in Attachment 2.

Question 13. Please provide suggestions for modifications of the vehicle classification. These suggestions should be as detailed as possible and should state the logic and rationale for the modification, as well as suggested definitions. An analysis of the pros and cons of each suggested modification should also be provided.

Comments on possible modification to vehicle classifications are contained in Attachment 2.

Question 14. Please provide comments on the possibility of raising the maximum gross vehicle weight rating and on the effects that this would have on manufacturers, consumers, U.S. automotive industry employment and the automotive industry in general.

Comments on inclusion of some or all of the vehicles 8,501 – 10,000 lbs. GVWR in the CAFE fleet are contained in Attachment 2.

Question 15. NHTSA requests comments on the above possible modifications to the CAFE program and other modifications that have been discussed, such as those mentioned in the National Academy of Sciences study. In addressing these possible modifications, please identify their positives and negatives; their estimated costs and benefits; their effect on manufacturers, suppliers, employees, and consumers; and the policy implications of each. The agency requests that each manufacturer specify how much lead time would be needed to respond to each possible modification and provide that information in terms of product planning cycles. To assist NHTSA, please be as specific as possible and provide any information that you believe will be helpful.

Comments on the above and other modifications to the CAFE program, including other policy options to reduce energy consumption are contained in Attachment 2.

Question 16. In examining the three paths that were chosen [by the NAS], please comment on whether they represent likely scenarios for technology bundling. If not, please comment on which technologies are likely to be bundled together and please identify the specific vehicle types and vehicles/models that might include them. In addition, please comment on the technologies already included on the

vehicle types/models, the projected vehicle weight and the percent of total model sales anticipated for each model (i.e., CVT - 45%, 5-Speed Automatic - 40%, 5-Speed Manual – 5%). Finally, please comment on the assumptions the NAS made in evaluating the three paths. Are there more plausible alternative assumptions?

The "bundling" of technologies as was done in the NAS Report is fundamentally flawed given that it was done in a manner that overlooked all system-level details with respect to how a specific technology interacts with powertrain processes. First, many of the "bundled" technologies operate principally on the same efficiency loss mechanism and therefore combined benefits cannot be calculated with simple arithmetic. Second, some of the listed technologies are available today and produce well-known and understood effects while others may never leave the research laboratory environment, i.e., low risk and high risk technologies are casually mixed under the heading of "emerging" with little regard for their ultimate feasibility. Obviously opinion becomes involved in many cases, and one only has to recall the Wankel engine and the two-stroke engine for automotive applications to be reminded of this phenomenon. It must be recognized that items like camless valve actuation and variable compression ratio, despite decades of effort, fall outside of the realm of technological incrementalism and are unlikely to ever impact vehicle fleet CAFE levels, let alone to do so by 2010!

Question 17. Should hybrid and fuel cell vehicles have been included in the paths? If so, which ones and which specific vehicle types? What technologies would be included with these types of vehicles?

Hybrid and fuel cell powertrains were appropriately excluded from all vehicle types that were the subject of the NAS Report. Highly unfavorable cost-benefit relationships and functionality are major obstacles to widespread introduction of these technologies. While DaimlerChrysler and many other manufacturers are planning to introduce, or already have in production, vehicles with these advanced technologies they are not yet cost competitive in the marketplace. These technologies will continue to mature and the manufacturers will develop valuable technical and market experience through these limited volume programs. However, these technologies will not reach high volumes or make a significant impact on the maximum technically feasible and cost-effective level of CAFE for the overall fleet within the next 20 years.

Question 18. Do you believe that the NAS study over or under estimated the fuel economy benefits from specific technologies? If so, which ones and why? Please provide NHTSA with your data that suggest a different benefit resulting from the application of these technologies.

Generally the NAS Report attributes reasonable fuel economy benefits to specific technologies. As stated in the question 16 response, camless valve actuation and variable compression ratio should not be included in future projections, despite the fact that there is never a shortage of commercial posturing on such things. There must be room for informed judgement in such matters. (Intake valve throttling is in limited production today, but it must be seen as high risk relative to durability and its cost-benefit relationship.)

> ***Question 19. Do you agree with the figures derived in the NAS break-even analysis? If not, why? Please address specific areas of differences, explain your reason(s) why, and provide supporting data for your reasons and arguments.***

There are two primary issues with the methodology of the NAS break-even analysis. As stated above, “bundling” of technologies and arithmetically calculating the resultant fuel economy and thus fuel saved to calculate the benefit is inappropriate. Each of the vehicle technologies considered will have attributes that are highly mission and duty-cycle sensitive and are therefore very difficult to characterize in real-world fuel economy terms. The application of any new technology will result in different percent improvements and costs based on the characteristics of the base vehicle, the number of units over which any investment is to be amortized, and a number of other system integration issues that cannot be generalized. When several new fuel economy improvement measures are implemented simultaneously the only way to assess the benefit is through the use of sophisticated vehicle simulation tools that estimate the system level interactions of technologies. The projections produced by these simulations must still be verified with vehicle testing of actual systems. When calculating the cost-benefit of technologies, the value of the fuel saved through the application of technology must be compared to the fully accounted costs of those technologies.

The second issue with the NAS analysis is the inability to adequately verify the source data. All estimates for cost-effectiveness are based on survey data with a small sample size. Given the limited number of vehicle manufacturers, any technology would have at most 10 estimates. Therefore the model for a price for fuel-consumption increases is a curve drawn through a number of technologies with a wide range of real results. Treatment of the lower range and upper range estimates as a “confidence interval” for the prediction will seriously overestimate the predictive power of the model. In the specific calculations within the break-even, the quadratic model fit is generally fine. Mid-car and Large-car fit the estimates quite badly at the upper end, underestimating costs by up to $329 and $964 respectively at the 39.5 mpg top end of the improvement range

> ***Question 20. For the forthcoming rulemaking and future CAFE rulemakings, benefit analysis will play an important role in NHTSA decisionmaking. NHTSA therefore seeks comments on the following specific benefit issues: Can you provide, in addition to the material in the NAS report, any methods and data that would be helpful in identifying, quantifying, and expressing in dollar units the potential benefits of alternative CAFE standards (including energy security, environmental, and other considerations)? Are there any ancillary studies that NHTSA or other federal agencies should commission to provide a stronger technical foundation for making benefit estimates in future CAFE rulemakings?***

A plausible list of the externalities of vehicle fuel consumption is given in the NAS Report: energy security, global climate change, and environmental pollution (NAS, 2002). Each of those is a valid concern, but the cost of each externality is debatable, and in total is surely no more than the $0.26 per gallon cited in the report. The cost benefit calculation required to determine the value of fuel efficiency technologies not change significantly if the maximum $0.26 per gallon saved is added. This does not include the countering effects of any costs incurred to maintain safety in the vehicle fleet or increased societal costs of congestion and increased accidents that would result from increased VMT.

A CAFE cost study was just published by Andrew Kleit at Pennsylvania State University (Kleit, 2002). It finds a long-run 3.0 MPG increase from current CAFE standards carries $2.97 billion dollars in annual social costs while reducing gasoline consumption by 5.1 billion gallons for a cost of $0.58 per gallon saved. Long-run is defined as having sufficient lead time for manufacturers to react to a new CAFE with product design changes, versus sales incentives to adjust the sales mix. A long-run gasoline tax of $0.11 cents per gallon will reduce consumption equally at a cost of only $275 million annually, or 9 percent of the cost of CAFE. (Kleit, 2002) A fuel tax is grossly more efficient than any conceivable CAFE construction, the effects would be available instantly as it would apply to the entire vehicle fleet and not just new vehicles. An even more attractive method of reducing energy consumption would be to cause all energy (instead of just motor vehicle fuel) to be valued by consumers through the application of a carbon tax at the mine mouth or well head. If introduced gradually, this would allow the entire economy to adjust and efficiently prioritize its use of energy.

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Evaluation of Alternatives and Modifications to Corporate Average Fuel Economy (CAFE) Standards

Note that there are a numerous important details that must be defined for any given fuel economy regulatory framework that are essential for detailed analysis, so the following comments are general in nature. Three specific frameworks are evaluated; (1) changes to CAFE, (2) alternatives to CAFE and (3) energy demand reduction policies.

1) ALTERNATIVES THAT RETAIN BASIC CAFE STRUCTURE

Combine import and domestic car fleets

Positives:
- Removes need for local content tracking and sourcing decisions based on CAFE
- In line with marketplace - distinction between import and domestic passenger cars is becoming more blurred by multinational corporations, transplants, NAFTA, etc.

Negatives:
- Would require new CAFE legislation to be debated/changed by Congress
- Ignores organized labor concerns about small vehicle production being moved outside U.S.
- No real impact on overall CAFE of the fleet
- As current CAFE does, this focuses only on new vehicles and does not affect driver behavior - less efficient than full cost energy pricing (e.g., carbon or gasoline taxes)

Competitive Impacts:
- Depending on current fleets some manufacturers will be advantaged and others will be disadvantaged - creates different winners and losers

Move “passenger vehicles” from truck to car fleet

Positives:
- None of a lasting nature, short-term public relations spike resulting from appearance of positive action would be overcome by negative response to downsizing and elimination of popular models

Negatives:
- Does not recognize added utility or unique attributes of “passenger vehicles” (e.g., towing capability, expanded cargo carrying, 4-wheel drive)
- The current car fuel economy standard (27.5 mpg) must be adjusted downward to account for these larger vehicles

- Moving passenger vehicles to the car fleet with its higher FE standard of 27.5 mpg would require a 33% fuel economy improvement and would almost certainly lead to downsizing of these vehicles
- Focuses only on new vehicles and does not affect driver behavior - less efficient than full cost energy pricing (e.g., carbon or gasoline taxes)

Competitive Impacts:
- Method of adjusting standard is unclear and has potential for large competitive impacts
- Manufacturers with higher passenger vehicle/car ratios are hurt – creates different winners and losers
- Could lower a manufacturer’s car <u>and</u> truck fleet fuel economy averages

Expand CAFE to include all Medium Duty Passenger Vehicles (MDPVs)

Positives:
- None

Negatives:
- Does not recognize unique utility of MDPVs (e.g., towing capability, expanded cargo carrying, 4-wheel drive)
- Adding larger MDPVs will lower the truck fleet fuel economy average
- The current truck fuel economy standard (20.7 mpg) must be adjusted downward to account for these larger vehicles
- Focuses only on new vehicles and does not affect driver behavior - less efficient than full cost energy pricing (e.g., carbon or gasoline taxes)

Competitive Impacts:
- Manufacturers that participate in the MDPV market segment would be hurt compared to those that do not - creates different winners and losers

Expand CAFE to include all trucks up to 10,000 lbs. GVWR

Positives:
- None

Negatives:
- Does not recognize unique utility of large “work” trucks (e.g., towing capability, expanded cargo carrying, 4-wheel drive)
- Extends beyond lead provided by Tier 2 (inclusion of only Medium Duty Passenger Vehicles - MDPVs) to include <u>all</u> trucks in the weight class.
- Adding larger trucks will lower the truck fleet fuel economy average

- The current truck fuel economy standard (20.7 mpg) must be adjusted downward to account for these larger vehicles
- Focuses only on new vehicles and does not affect driver behavior - less efficient than full cost energy pricing (e.g., carbon or gasoline taxes)

Competitive Impacts:
- Difficult to assess (fuel economy of vehicles added not currently reported)
- Certain manufacturers will be more impacted than others - creates different winners and losers

2) RESTRUCTURE FUEL ECONOMY REGULATIONS

Tradable fuel economy credits

Set a standard for fleet fuel economy; manufacturers that exceed standard can sell credits; manufacturers that fall short of standard can buy credits; U.S. government acts as credit broker and provider of credits of last resort at a set price.

Positives:
- Government acting as credit supplier of last resort can avoid short term market imperfections that would otherwise disrupt long term planning

Negatives:
- Option for a manufacturer to buy their way out of non-compliance risks constantly tightening standards without regard to technical feasibility
- A manufacturer forced to use trading risks being branded a technology laggard, when shortfall could arise from mix shifts
- Due to product mix differences, a manufacturer could continuously be forced to pay fees that result in financing technology and product advancements of competitors
- Consideration of trading program as compliance option shifts focus from real technology solutions

Competitive Impacts:
- Does not recognize product mix differences between manufacturers – creates different winners and losers

Implementation Issues:
- Require new government bureaucracy to administer trading program
- Adjusting ceiling price on credits is critical

Simple feebate

Set a trigger point for fuel economy, vehicles that exceed trigger receive rebates and those that fall below pay fees

Positives:
- None

Negatives:
- Another form of CAFE (subsidize small cars and penalize large cars to affect market mix)
- Removes a manufacturer's flexibility by externally imposing mix-shifts that may not help meet the standard
- Less efficient than full cost energy pricing (e.g., carbon or gasoline taxes)
- Does not guarantee fleet fuel economy improvement and therefore is not an improvement over CAFE
- Feebate schemes are often misconstrued as a market-based system that addresses concerns with CAFE
- Burdens families, farmers, car poolers, and small businesses that require larger cars and trucks to meet their needs
- Focuses only on new vehicles and does not affect driver behavior - less efficient than full cost energy pricing (e.g., carbon or gasoline taxes)

Competitive Impacts:
- Transfers revenues from full line manufacturers to manufacturers concentrated at the small end of the market

Implementation Issues:
- Requires a new implementation bureaucracy and temptation will be to create revenue rather than maintain "revenue neutral" system

Weight based attribute approaches

Fleet can be segmented into distinct weight classes or individual models have to meet individual targets or a continuous curve

Positives:
- While still an imperfect correlation - weight has some correlation to fuel economy
- Removes "safety issue" caused by weight reduction

Negatives:
- Not all customer-desired vehicle attributes are tied to weight (e.g., exterior styling/aerodynamics, 4-wheel drive, traction control, special tires, etc.)
- Removes incentive to reduce weight or substitute materials as an option to reduce fuel consumption

- Class-based approaches versus continuous measures have undesired effect of rewarding packages moved into next larger weight class
- Class-based approach lumps vehicles and sets standards that do not fully account for vehicle differences
- Does not guarantee fleet fuel economy improvement and therefore is not an improvement over CAFE
- Focuses only on new vehicles and does not affect driver behavior - less efficient than full cost energy pricing (e.g., carbon or gasoline taxes)

Competitive Impacts:
- Specific models could be unfairly penalized

Implementation Issues:
- Weight “class” structure with additional flexibility measures (average models in each class, trade shortfalls and surpluses among classes, and carry forward or backward credits between model years) policy can "act" like a fleet average approach
- Without flexibility measures, weight “class” structure is <u>very</u> constraining, especially when only a few different models are sold in a given weight class

Size or interior volume based attribute approach

Segment fleet by EPA size class (or some other utility-based metric) with each class having its own fuel economy standard

Positives:
- Insulates full line producers against segment mix shifts
- Market incentives can be targeted at a specific model that is above the standard in its size class
- Aligns with customer desires for more internal space

Negatives:
- Not all customer-desired vehicle attributes are tied to interior volume (e.g., vehicle performance, towing capability, 4-wheel drive)
- Current EPA truck segmentation is not suitable for this purpose -- new classifications would have to be developed
- Since it is a class-based approach and not a continuous measure, would have undesired effect of rewarding packages moved into next higher size class
- Class-based approach lumps vehicles and sets standards that do not fully account for vehicle differences
- Does not guarantee fleet fuel economy improvement and therefore is not an improvement over CAFE
- Focuses only on new vehicles and does not affect driver behavior - less efficient than full cost energy pricing (e.g., carbon or gasoline taxes)

Competitive Impacts:

- Specific models could be unfairly penalized (e.g., a 4-wheel drive SUV could have equivalent interior volume to a FWD sedan)

Performance based attribute approach (horsepower or displacement)

Segment fleet into horsepower classes with each class having its own fuel economy standard

Positives:
- Aligns with customer desires for more powerful engines
- Potential to reward highly efficient variations of a model while not rewarding the less efficient variations
- With classes based on powertrains, not models, high and low fuel-efficient vehicles would be more differentiated leading to greater focus on powertrain efficiency and less on aerodynamics, rolling resistance, etc.

Negatives:
- Not all customer-desired vehicle attributes are tied to performance (e.g., interior volume, 4-wheel drive)
- Currently no accepted classes based on engine displacement or power
- Class-based approaches, compared to continuous measures, have undesired effect of rewarding packages moved into next higher horsepower class
- Removes flexibility to improve fuel economy by lowering the mix of more powerful engines for any given model
- Class-based approach lumps vehicles and sets standards that do not fully account for vehicle differences
- Does not guarantee fleet fuel economy improvement and therefore is not an improvement over CAFE
- Focuses only on new vehicles and does not affect driver behavior - less efficient than full cost energy pricing (e.g., carbon or gasoline taxes)

Competitive Impacts:
- Specific models would be unfairly penalized
- Favors manufacturers with higher power to weight ratios – creates different winners and losers

Uniform percent CAFE increases

Positives:
- Every manufacturer has to improve

Negatives:

- Would penalize manufacturers for early CAFE improvements
- Does not account for fleet mix changes
- Focuses only on new vehicles and does not affect driver behavior - less efficient than full cost energy pricing (e.g., carbon or gasoline taxes)

Competitive Impacts:
- Manufacturers impacted differently – creates different winners and losers

3) ENERGY DEMAND REDUCTION POLICIES

Carbon tax or fee

Controls applied upstream at the mine mouth or well head of the energy source - ultimately translate to increased fuel prices for all energy-use streams

Positives:
- Market-based, cost-effective option causing minimum economic disruption -- market will determine how best to use energy
- Provides largest CO_2 reductions at lowest cost (only about 2,000 energy providers/sources worldwide)
- Economic studies have shown carbon taxes to be much more cost effective than CAFE system for reducing CO_2 emissions
- Other industries (such as oil and utilities) and consumers forced to share CO_2 reduction burden
- Incremental restrictions (controls) on energy would allow marketplace to learn and adjust
- Affects all energy users - applies to entire vehicle park, not just new vehicles
- Reduces vehicle miles traveled, encourages more energy-efficient driver behavior, and leads to the purchase of higher fuel economy vehicles

Negatives:
- Lower income families pay higher percentage of income for energy -- requires some type of offset to avoid regressivity

Competitive Impacts:
- Assuming slow price increases, does not burden one manufacturer over another
- Market pulls full line manufacturers towards higher fuel economy models or requires added technology, which now becomes cost effective

Implementation Issues:
- Any shift from application upstream to downstream quickly becomes unworkable
- Most effectively applied at international level
- Slow increases in fuel prices would allow manufacturers and consumers to adjust to changing market conditions

Carbon cap and trade

Controls applied upstream at the mine mouth or well head of the energy source; ultimately translate to increased fuel prices for all energy-use streams; trading allowed between fuel providers

Comments:

- Same as carbon tax – except trading allows upstream energy providers additional flexibility

Gasoline tax

Controls applied at the fuel pump

Positives:

- Economic studies have shown carbon taxes and fuel pricing tools to be much more cost effective than CAFE system for reducing CO_2 emissions
- Incremental restrictions (controls) on gasoline would allow marketplace to learn and adjust
- Affects all gasoline users - applies to entire vehicle park, not just new vehicles
- Reduces vehicle miles traveled, encourages more energy-efficient driver behavior, and leads to the purchase of higher fuel economy vehicles

Negatives:

- Less economically efficient than carbon tax - does not capture other business sectors' fossil fuel use
- Lower income families pay higher percentage of income for energy -- requires some type of offset to avoid regressivity

Competitive Impacts:

- Assuming slow price increases, does not burden one manufacturer over another
- Market pulls full line manufacturers towards higher fuel economy models or requires added technology, which now becomes cost effective

Implementation Issues:

- Slow increases in fuel prices would allow manufacturers and consumers to adjust to changing market conditions

III. Specifications, Question #12 (Page 1 of 2)

Actual and Projected U.S Sales Volumes

DaimlerChrysler 2WD Light Trucks Sales *							
	Model Year						
	1996	1997	1998	1999	2000	2001	2002
0-8500 GVW							
Std Pickup Heavy	2,468	0	0	0	0	0	
Std Pickup Light	163,654	136,700	162,858	146,746	76,867	201,912	
Compact Pickup	70,544	81,871	111,316	82,075	114,127	88,243	
Std Cargo Van Heavy	1,024	745	4,456	6,752	8,635	7,959	
Std Cargo Van Light	56,307	58,455	29,675	40,268	33,070	20,390	
Std Passenger Van Heavy	1,285	1,612	2,941	4,721	4,592	4,325	
Std Passenger Van Light	5,846	4,681	1,100	1,585	1,420	1,126	
Compact Cargo Van	0	0	0	0	0	0	
Compact Passenger Van	635,151	503,142	493,802	508,980	539,403	383,111	
Std Utility	0	0	0	0	0	0	
Compact Utility	99,861	88,560	111,677	147,498	212,192	322,699	
Other	0	0	0	0	0	0	
8500-10,000 GVW							
Std Pickup Heavy	22,999	17,128	22,321	26,662	13,299	41,801	
Std Vans Heavy	19,826	26,029	16,249	22,058	23,991	21,187	
Total 0-8500 GVW 2WD	1,036,140	875,766	917,825	938,625	990,306	1,029,765	
Total 8500-10000 GVW 2WD	42,825	43,157	38,570	48,720	37,290	62,988	
Total 2WD	1,078,965	918,923	956,395	987,345	1,027,596	1,092,753	

2002 MY Projections are CONFIDENTIAL

* Includes Chrysler Group, Mercedes, Mitsubishi and Freightliner

III. Specifications, Question #12 (Page 2 of 2)

Actual and Projected U.S Sales Volumes

DaimlerChrysler 4WD Light Trucks Sales *							
	Model Year						
	1996	1997	1998	1999	2000	2001	2002
0-8500 GVW							
Std Pickup Heavy	2,453	1	0	0	0	0	
Std Pickup Light	92,938	136,447	131,950	124,504	64,179	157,281	
Compact Pickup	26,914	46,791	41,306	51,983	72,604	70,149	
Std Cargo Van Heavy	0	0	0	0	0	0	
Std Cargo Van Light	0	0	0	0	0	0	
Std Passenger Van Heavy	0	0	0	0	0	0	
Std Passenger Van Light	0	0	0	0	0	0	
Compact Cargo Van	0	0	0	0	0	0	
Compact Passenger Van	4	15,407	14,276	15,279	14,512	15,690	
Std Utility	0	0	0	0	0	0	
Compact Utility	381,640	418,227	579,817	669,857	662,366	541,559	
Other	0	0	0	0	0	0	
8500-10,000 GVW							
Std Pickup Heavy	46,911	51,972	58,832	71,402	35,909	109,803	
Std Vans Heavy	0	0	0	0	0	0	
Total 0-8500 GVW 4WD	503,949	616,873	767,349	861,623	813,661	784,679	
Total 8500-10000 GVW 4WD	46,911	51,972	58,832	71,402	35,909	109,803	
Total 4WD	550,860	668,845	826,181	933,025	849,570	894,482	

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* Includes Chrysler Group, Mercedes, Mitsubishi and Freightliner